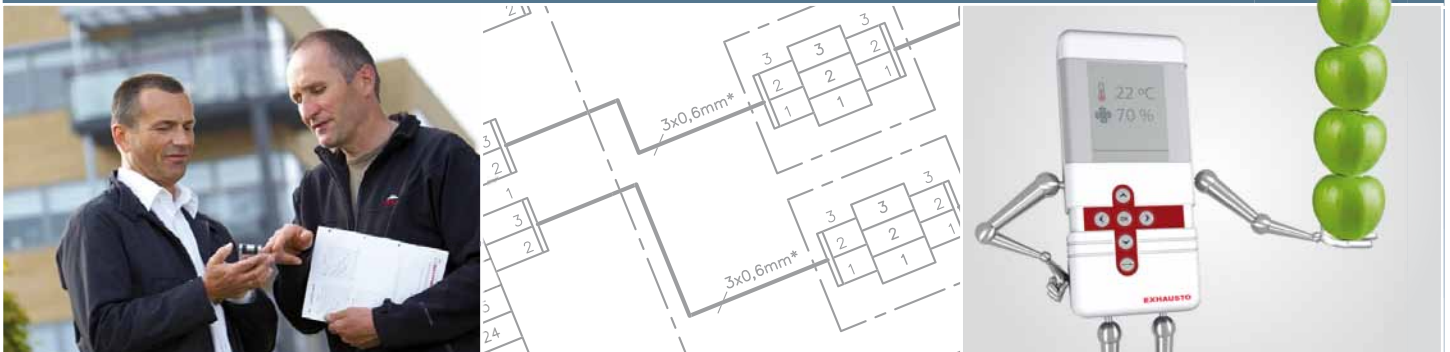


VEX340

Air handling units with counter flow heat exchangers



VEX340: 400-2250 m³/h



EXHAUSTO

FOR A BETTER FLOW



Table of contents

VEX340 (400–2250 m³/h) 4

- Technical data 4
- Capacity curves – compact filters 5
- Temperature efficiency 5
- Sound data 6
- Water heating coil / motor valve data 7
- Cold water coil / motor valve data 8
- Dimensional sketches 9

VEX340 EXact Control System..... 10

- Control and Operation..... 10
- Connection to external units 11
- Innovative ice detection and control system 12
- Energy calculations 13
- Function overview..... 14
- Advanced standard functions..... 16
- Technical data, modules 17

VEX340 General..... 18

- Simplified diagrams / Abbreviations 18
- Cable plans..... 20
- Outdoor installation..... 23

Find more information

Technical submission data together with principles for connection of water heating coil / cold water coil can be found on our website under each individual product.

The website also allows users to make technical submission calculations and find prices of the complete system and accessories.

VEX340 energy-efficient unit

Highly-efficient counter flow heat exchangers

VEX350/VEX360 units are supplied with highly-efficient counter flow heat exchangers, where airstreams are always 100% separated. The de-icing technology allows continuous operation, even with low outdoor air temperatures.

Integrated control system

The control system is integrated in the top of the unit. Control and power supply cables connect to the integrated connection box, which also houses the control fuses and isolation switch.

External heating coil/ cold water coil

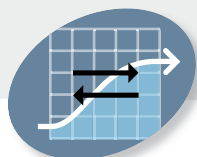
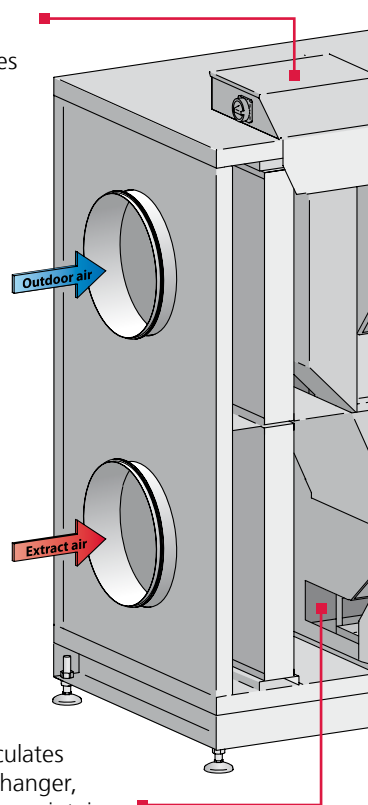
Can be supplied as accessories. An electrical preheating coil is available for installations in areas with low outdoor air temperatures and high extract air humidity levels.

Service-friendly unit

The unit's large apertures ensure easy access for servicing and cleaning. The filters, counter flow heat exchanger and motor section can be easily removed for cleaning, servicing and replacing (filters). The door is hinged and removable.

Internal bypass

The unit have standard built-in modulating bypass for optimal comfort. The bypass circulates the extract air around the counter flow exchanger, depending on the need for heat recovery to maintain the desired supply air temperature, all year round.



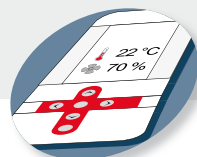
High efficiency

Efficient counter flow heat exchanger delivers optimum efficiency of 85 % or more.



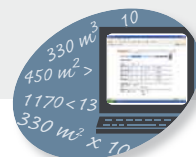
Energy efficient

Low SFP value = lower energy consumption.



User friendly

Control panel with large colour display and user friendly symbols and help texts.



Online calculation

User-friendly website for professionals with news, comprehensive documentation and product calculation programmes.

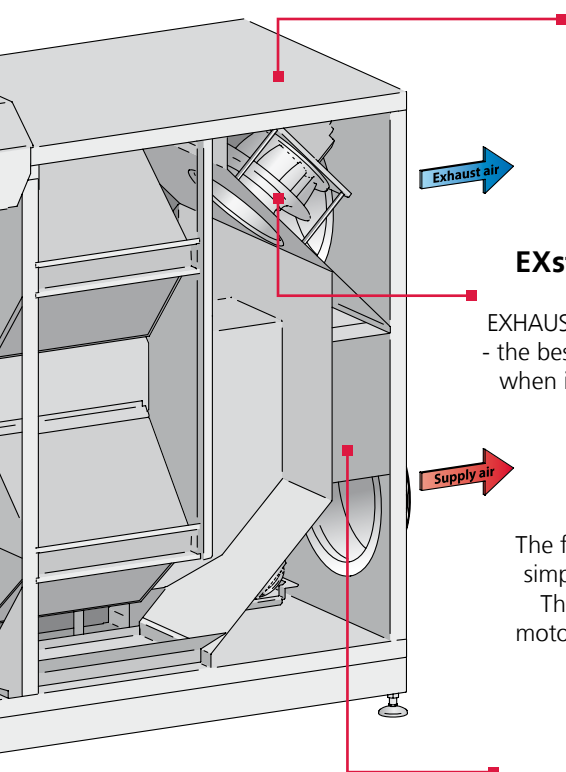
- 85% temperature efficiency or greater ..!

Two counter flow heat exchangers create a unit that has an extremely high temperature efficiency and low pressure loss.

- 80-85% efficiency without condensation
- Up to 94% efficiency with condensation

FAST TRACK

Please contact us if you need an extra fast delivery time



Cabinet

The cabinet is made of Aluzinc® AZ185 corrosion class C4 and is insulated with 50 mm mineral wool.

EXstream performance

All units are supplied with EXHAUSTOs EXstream fan impeller, - the best of its kind in the market when it comes to high efficiency and low sound levels.

Fan housing

The fans are fitted on rails, for simple removal and servicing. The suspension housing the motor, fan impeller and intake is designed to minimise vibrations.

Motor control (FC)

The fan motors are controlled by frequency converters which ensures energy-saving operation.

EUROVENT certification

The EXHAUSTO air handling units in range VEX300 are all EUROVENT certified. The certificate documents that all technical data provided are third party tested by an individual certification body (EXHAUSTO has been tested and verified by TÜV Nord). This, in terms, means that all data provided by the online calculation tools QuickSelect and EXselect has been verified in tests.

EUROVENT Energy labelling

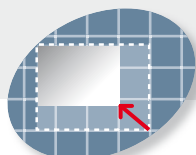
The EXHAUSTO air handling units type VEX300 are energy labelled according to EUROVENT guidelines for classification of air handling units. The energy class equals the total energy consumption of the unit at given operation parameters.

Find more information on our website



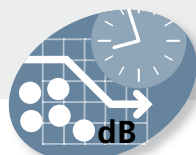
Hygiene

The units have been independently certified in accordance with the German standard VDI 6022.



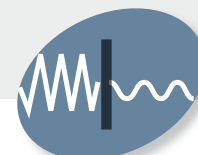
Compact

The unit can be moved through a standard door (900 x 2,000 mm).



Soundproofed

Save time and money on soundproofing.



Vibration free

Minimum vibration = less noise and no extra resources required to be invested on vibration damping for the base.

VEX340 Technical data (400–2250 m³/h)

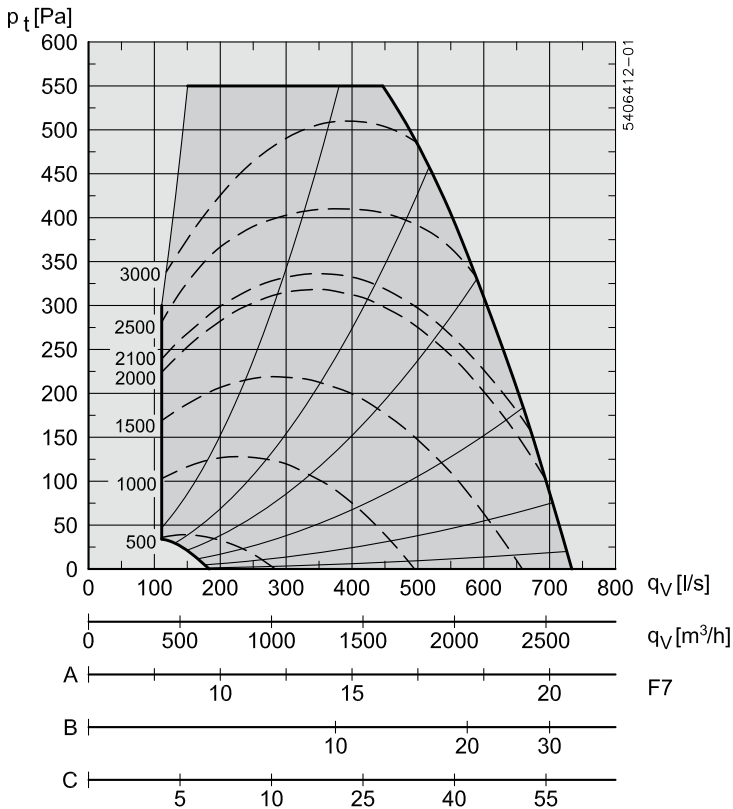
VEX340

Unit data		
Absorbed power	1.8 kW	
Max. phase current	13.0 A (Power consumption is not sinusoidal)	
Power supply	1 x 230 V + N + PE ~ 50 Hz	
Principal dimensions, excl. spigots and cable duct.		Height = 1803 mm, Length= 1765 mm, Width = 946 mm
Integrated connection box for control components		Height = 104 mm (see dimensional sketch page 9)
Panel material		Aluzinc AZ185, corrosion class C4 in acc. with EN/ISO 12944-2
Insulation		50 mm mineral wool
Connection to duct system		ø400 mm
Service doors (removable)		2 side-mounted doors
Filters (filter class specified when ordering)	Compact filter (outdoor air/extract air)	qty. 1 F5 - 6.9 m², 716 x 836 x 96 mm
	Compact filter (outdoor air/extract air)	qty. 1 F7VDI - 21.6 m², 716 x 836 x 96 mm
Weight: Operational-ready unit		450 kg
Weight: Unit for internal transport		282 kg (excl. doors, fan unit, bypass section, counter flow heat exchanger and filters)
Highly-efficient counter flow heat exchanger with aluminium panels		qty. 2
Fan data		
Fan type		EXstream, freely revolving B-impeller
Vibration damping		Ventilators suspended on vibration dampers
Motor data (per motor)		With integrated control system
Voltage supply (delta/star)		3 x 230 V / 400 V
Current (delta/star)		3 x 2.6 A / 1.5 A
Power rating		0.55 kW
CEMEP class		As EFF1
Frequency converter data		With integrated control system
Voltage input		1 x 230 V
Voltage output		3 x 230 V
Current overload protection		Built-in
Regulation (not applicable for units for third-party control systems)		Variably adjustable via frequency regulation

Accessories			in accordance with VDI6022
VEX340OD	VEX340 for outdoor installation	Special cover and jointing of unit	yes
HCW340HK	Heating coil (water)	6.7 kW Weight: 15.5 kg	yes
HCE340HK6	Heating coil (electrical) 400 V	6.0 kW, 1 modulating step Weight: 25 kg	yes
CCW340HK	Cold water coil (non-insulated)	9.2 kW Weight: 39 kg	
CCW340	Cold water coil in 50 mm insulated cabinet	9.2 kW Weight: 72 kg	yes
CCW340OD	Cold water coil in 50 mm insulated cabinet for outdoor fitting	9.2 kW Weight: 72 kg	yes
PHCE340HK12	Preheating coil (electrical)	3 x 400 V 12 kW Weight: 9 kg	yes

VEX340 Capacity curves

VEX340



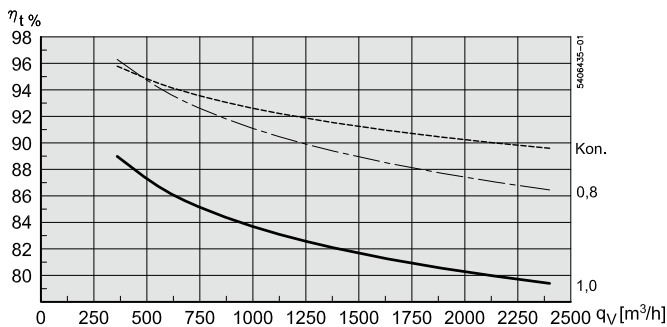
- Capacity curve with F5 filters
- - SFP curve [J/m³]
- Operating curves
- A = Pressure loss supplement with F7 filter
- B = Pressure loss supplement with HCE/HCW
- C = Pressure loss supplement with CCW

Capacity calculations are based on conditions given on our website.

To calculate capacity data, use our product calculation software on our website.



VEX340 Temperature efficiency



- Efficiency without condensation according to EN308
Extract air = 25°C/30% RH - Outdoor air = 5°C/50% RH
Balance between supply air/extract air = 1.0
- - Efficiency without condensation with imbalance
Extract air = 25°C/30% RH - Outdoor air = 5°C/50% RH
Balance between supply air/extract air = 0.8
- Efficiency with condensation
Extract air = 20°C/55% RH - Outdoor air = -10°C/50% RH
Balance between supply air/extract air = 1.0

The VEX unit temperature efficiency is shown at different volume flow ratios, calculated as:

Supply air = 0.8 and 1.0
Extract air

$$\eta_t = \frac{t_{2,2} - t_{2,1}}{t_{1,1} - t_{2,1}} = \text{Temperature efficiency}$$

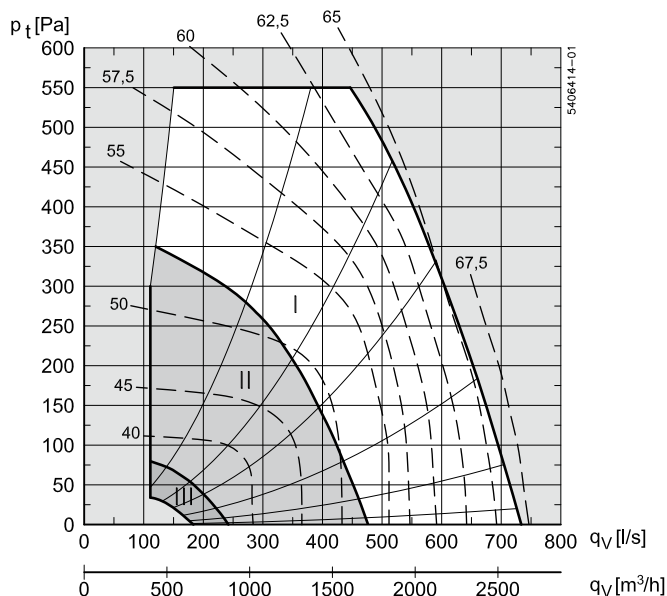
$t_{2,1}$ = Temperature of outdoor air

$t_{2,2}$ = Temperature of supply air

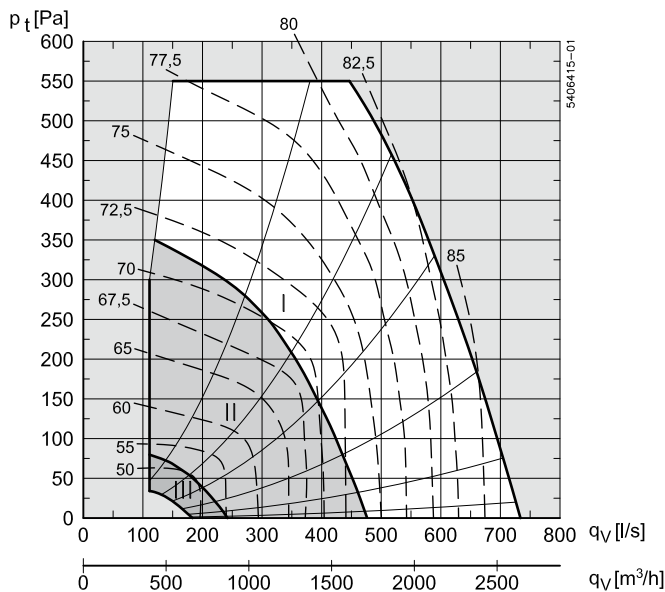
$t_{1,1}$ = Temperature of extract air

VEX340 Sound data

VEX340 L_{WA1} - Suction side



VEX340 L_{WA2} - Pressure side



Suction side (outdoor air/extract air):

$$L_{W1} = L_{WA1} + K_W$$

L_{WA1} read from graph
 K_W read from table

Pressure side (supply air/exhaust air):

$$L_{W2} = L_{WA2} + K_W$$

L_{WA2} read from graph
 K_W read from table

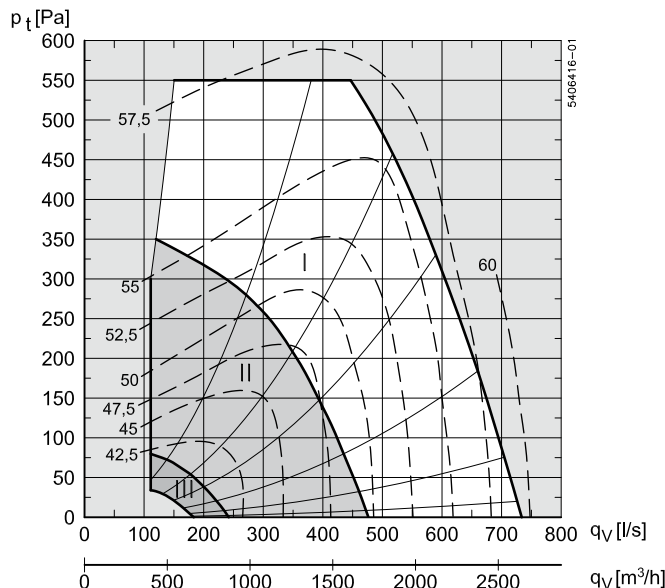
Surroundings:

$$L_{W3} = L_{WA3} + K_W$$

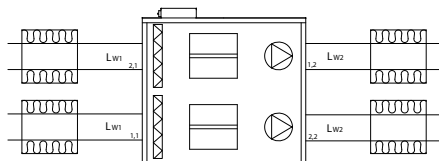
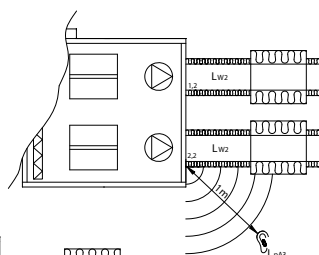
L_{WA3} read from graph
 K_W read from table

		K_W (dB)								K_{pA} dB(A)
		Ranges	63	125	250	500	1K	2K	4K	
L_{W1}	I		18	8	-11	1	-12	-20	-25	-32
	II		21	11	-1	-2	-11	-21	-27	-21
	III		24	14	-6	-8	-17	-24	-21	-14
L_{W2}	I		-1	-5	-5	-2	-5	-7	-15	-27
	II		8	1	4	-6	-6	-8	-18	-23
	III		18	8	0	-6	-5	-9	-21	-18
L_{W3}	I		20	13	1	-6	-8	-12	-17	-15
	II		18	12	5	-5	-10	-13	-15	-15
	III		13	9	0	3	-10	-12	-11	-9

VEX340 L_{WA3} - Surroundings



Sound measurements are based on conditions given on our website.



HCW340 Technical data for water heating coil – accessories

Technical data

Test pressure	3000 kPa
Max. operating pressure	1600 kPa
Number of rows of pipes	1
Number of circuits	2
Face area (HxW)	420 x 520 mm
Pipe connection	DN15 (1/2")
Fin spacing	1.6 mm
Weight (without fluid)	15.5 kg
Water content	1.3 l

Calculation example for water heating coil

Conditions	
Water supply temperature	60 °C
Water return temperature	40 °C
Tolerance of calculated results	± 10 %
Volume flow ratio	1.0
Heat recovery	100 %

NB:

For frost protection using glycol, the output values in the table below must be reduced by approximately 15–20%.

VEX340

Example of calculated values for the heating coil

We recommend the heating coil requirements are precisely calculated using the EXselect product selection software tool on our website, which also includes more comprehensive calculation data.



VEX340 (2000 m³/h) / HCW340 heating coil (100 % heat recovery)									
Outdoor air temp./humidity	Room temp./humidity	Temp. and humidity after exchanger	HCW output	Supply air temp./humidity	Water flow	Δp HCW	K _{vs}	Δp K _{vs}	Δp air side
[°C / %]	[°C / %]	[°C / %]	[kW]	[°C / %]	[l/h]	[kPa]		[kPa]	[Pa]
-12 / 80	22 / 20	16.0 / 10.0	3.3	22 / 7	144	0.167	0.4	12.97	20
-20 / 85	22 / 20	14.7 / 5.0	4.17	22 / 6.3	183	0.183	0.4	20.84	20

CCW340 technical data for cold water coil – accessories

VEX340

Technical Data

Test pressure	3000 kPa
Max. operating pressure	1600 kPa
Number of rows of pipes	4
Number of circuits	8
Face area (HxW)	500 x 610 mm
Pipe connection	DN25 (1")
Fin spacing	2.8 mm
Weight, non-insulated (without fluid)	39 kg
Weight, insulated model (without fluid)	72 kg
Water content	3.5 l

Capacity diagrams for cold water coil

Conditions

Supply water temperature	6 °C
Return water temperature	12 °C
Tolerance of calculated results	± 10 %
Volume flow ratio	1.0
Cooling recovery	100 %

NB:

The output values in the table below are for a glycol content of 25 %.

Example of calculated values for the cold water coil

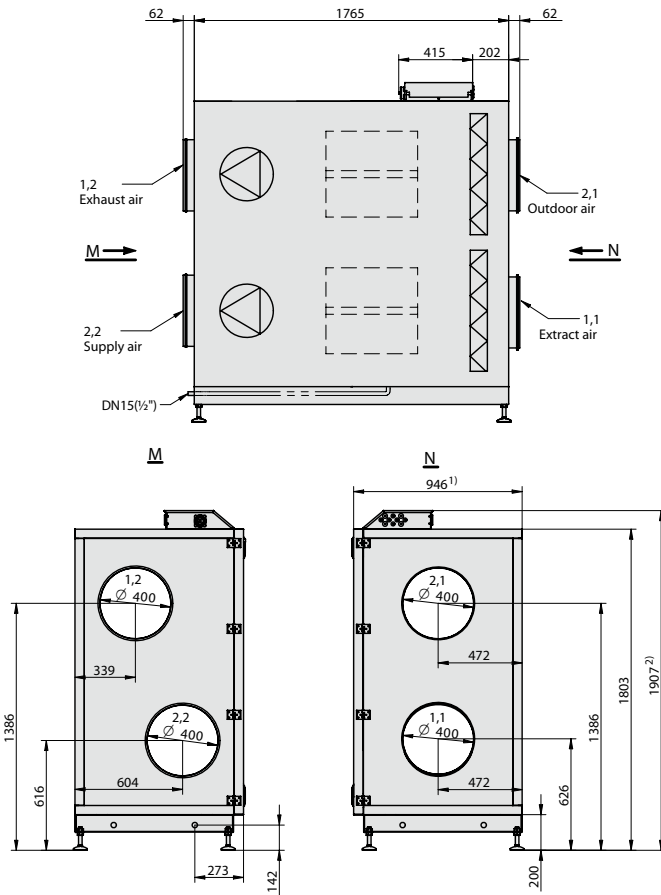
We recommend the cold water coil requirements are precisely calculated using the EXselect product selection software tool on our website, which also includes more comprehensive calculation data.



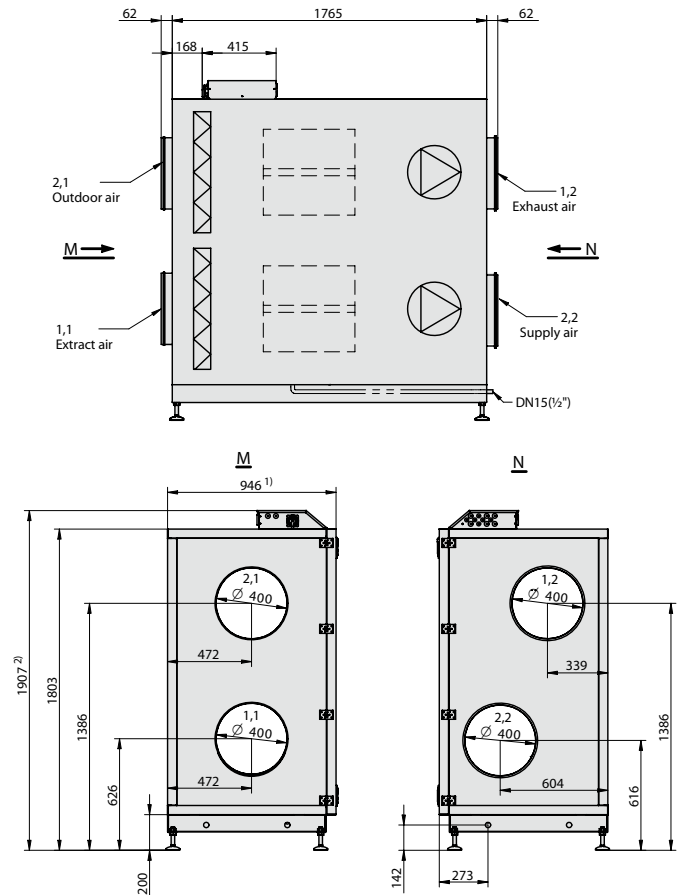
VEX340 (2000 m³/h) / CCW340 cold water coil (100 % cooling recovery)									
Outdoor air temp./ humidity	Room temp./ humidity	Temp. and humidity after exchanger	CCW output	Supply air temp./humidity	Water flow	Δp CCW	K _{vs}	Δp K _{vs}	Δp air side
[°C / %]	[°C / %]	[°C / %]	[kW]	[°C / %]	[l/h]	[kPa]		[kPa]	[Pa]
28 / 50	24 / 50	24.7 / 61	9	16.8 / 84	1399	13.5	2.5	31	40
32 / 40	26 / 50	27.1 / 53	10.6	17.2 / 81	1668	18	2.5	44	40

VEX340 Dimensioned sketches

VEX340 Horizontal, Left



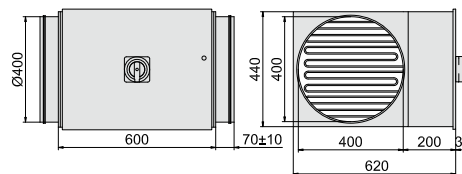
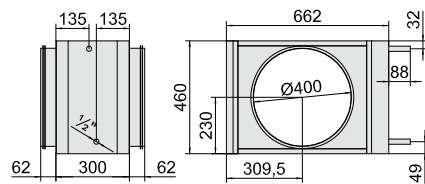
VEX340 Horizontal, Right



Heating coil - water (HCW) and electric (HCE) - measured in mm

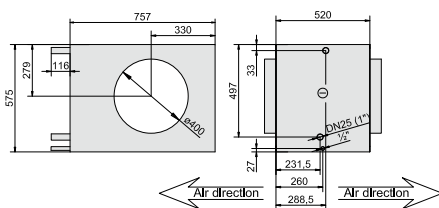
Water heating coil (HCW)

Electric heating coil (HCE)

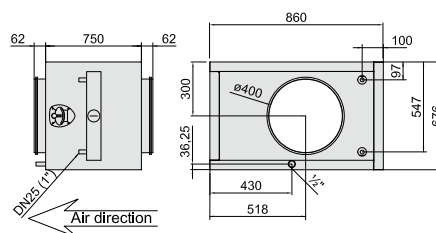


- 1) Allow a distance for service in front of the unit that is equivalent to the unit depth
- 2) Allow a min. of 200 mm free height for service

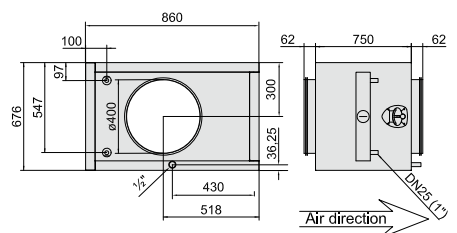
Cold water coil (CCW) Non-insulated



Cold water coil (CCW) Insulated, Left



Cold water coil (CCW) Insulated, Right



EXact control system

Behind every operation, the advanced EXact control ensures the air handling unit operates as effectively and economically as possible. The control can easily be adjusted to the daily rhythm of the location, whether it is a school, office or residence.



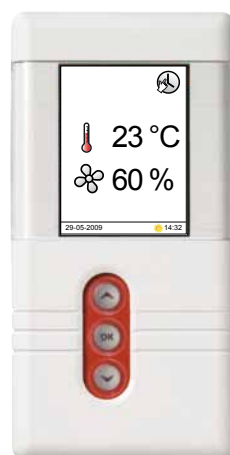
The essential EXact parameters are:

- Simple operation
- Three user modes, two which require access codes (technician and specialist)
- Several indoor air quality levels with options such as on-demand ventilation via the built-in weekly clock
- Built-in web server allows monitoring and control over the internet (TCP/IP)
- Can connect to a DDC unit via Modbus RTU as standard and LON options
- See several more selected functions in the function overview

HMI control panel

The control panel is designed so that it can be operated in two modes, locked or opened. If set in locked mode, the control panel can only be used for normal, daily use, and the user cannot access advanced menus or parameters.

In opened mode, the technician or specialist has access to extra buttons and to more advanced menus and functions. The control panel requires a code to be operated in open mode.



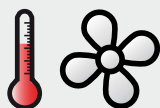
User menu

The user menu is for daily operations. It shows visual symbols to indicate the unit's status and provide information. The interface allows the user to temporarily change the temperature and ventilation level.



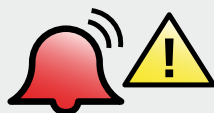
Support texts

The very useful support texts displayed in the yellow area minimise the need for manuals and instructions. Support texts are available in both technician and specialist modes.



Temperature level/ventilation level

Temperature and ventilation levels can easily and quickly be changed temporarily. Set points are shown together with visual symbols in the display.



Alarm/warning

The EXact control system will generate a warning symbol if it detects operational disturbances. The display will show an alarm bell if more serious disturbances have been detected.



External stop

If the ventilation system has been stopped by an external stop signal, this symbol will appear in the display.

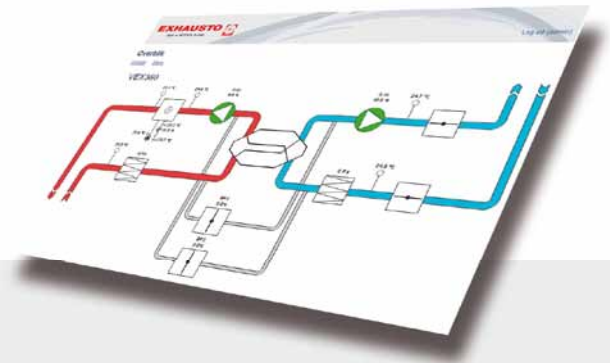


De-icing

If the built-in de-icing function is in operation, this symbol will appear in the display.

Connection to external units

The EXact control system meets every control requirement for maintaining a perfect indoor climate



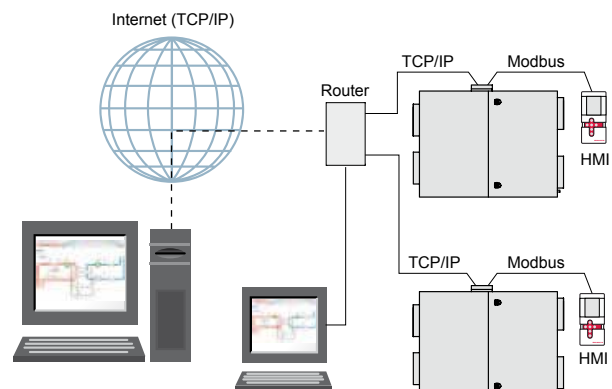
Web server

The EXact control system is supplied with a web server (TCP/IP). This enables various options:

1. The unit can be monitored and configured using a local PC.
2. The unit can be connected to a local area network (LAN) and any PC connected to LAN.
3. The unit can be connected to the internet and external internet-enabled PCs.

The only requirement is that the connected PC has a browser. The web server is password protected.

The web server user interface is designed in the same logical fashion as the control panel. Uniformity makes the system easy to use. The overview screen configuration is complete and ready to monitor the ventilation unit and any accessories.



Connection to BMS unit

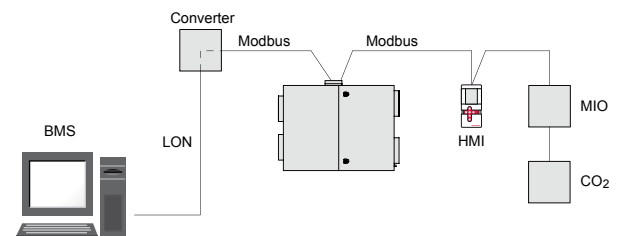
The EXact control system can communicate via standardised Modbus RTU. Thus, a BMS unit that uses Modbus can easily be connected.

Connection to other protocols

Accessories

MLON - Module for converting to LON protocol

MTCP - Module for converting to TCP/IP



Manual

The EXact control system can be operated in manual mode. When operating in manual mode, the hand symbol will appear in the display.

Weekly plan

When operating with the weekly plan activated, the clock symbol will appear in the display.

Overrides

When temperature and ventilation level set points are changed, the override symbol will appear in the display while the settings are overridden by the next change in the weekly plan.

Summer/winter

The EXact control system automatically changes from summer time to winter time. The display indicates either summer time or winter time.

Innovative ice detection and control



Frost protection

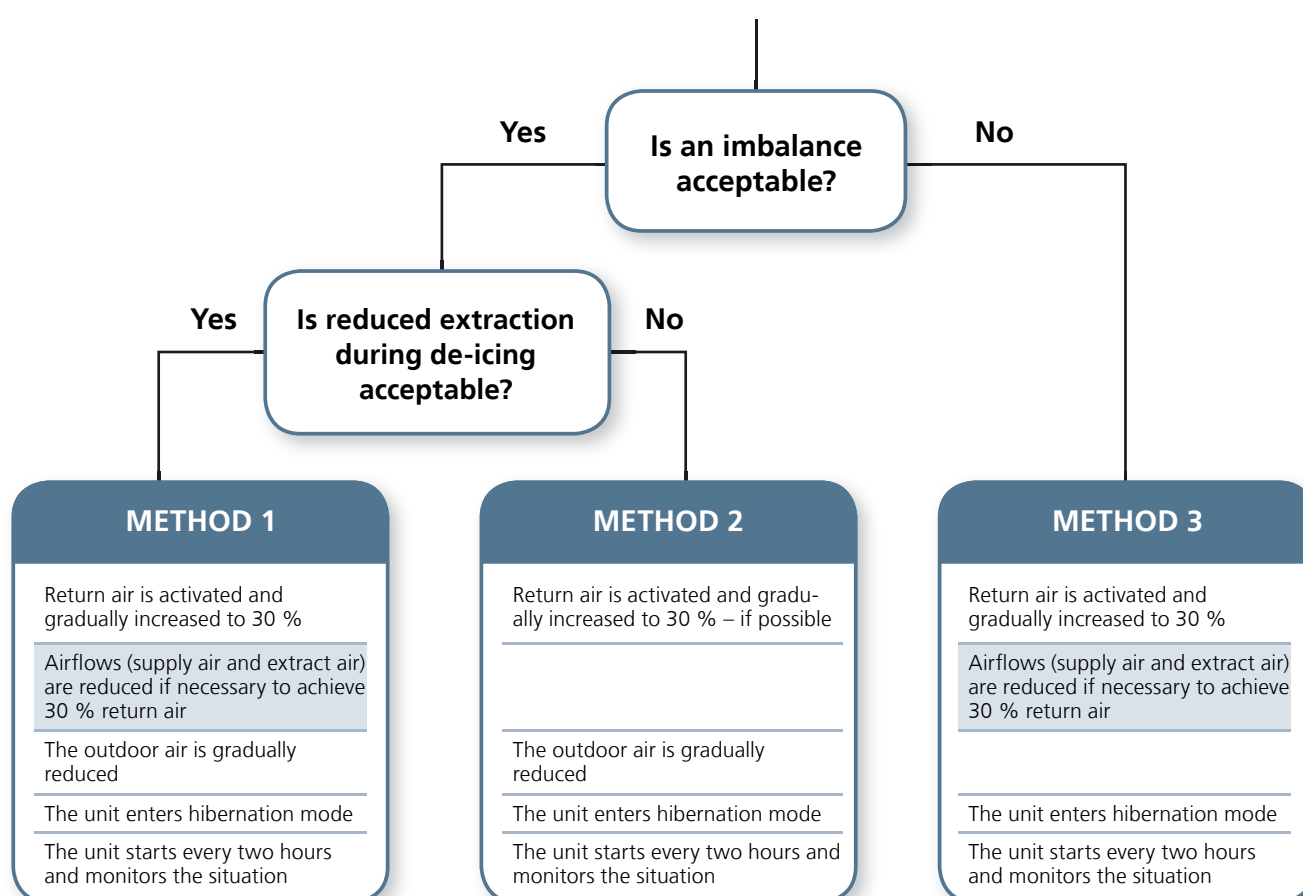
Highly efficient counter flow heat exchangers can be prone to icing as the air extracted from a room can contain moisture. When the energy from this extracted air is used (when the air cools), the moisture condenses to water vapour, which collects in the heat exchanger.

The high efficiency means that some areas inside the heat exchanger become very cold, and in these areas water will freeze and form ice. This can block the airflow. To counteract this a new control principle has been developed, which ensures optimal operation.

To ensure EXHAUSTO counter flow heat exchangers can operate in areas that have low outdoor temperatures EXHAUSTO has developed a unique extract air system.

When ice begins to form inside the counter flow heat exchanger, the VEX340H control system circulates up to 30 % of the warmed supply air back into the cold outdoor air. This raises the temperature, and helps to prevent icing.

To the right side we have the return air principles and below we have the different frost protection methods.



NB! This function is only active for airflow control methods 2 and 5 See below for details.

Air regulation - Six different methods of regulation can be selected:

Air flow control

2. Constant airflow

Constant pressure regulation of extract air

3. Constant pressureregulated extract air with fixed supply air setting
5. Constant pressureregulated extract air with slave-controlled supply air

Constant pressure regulation of supply air

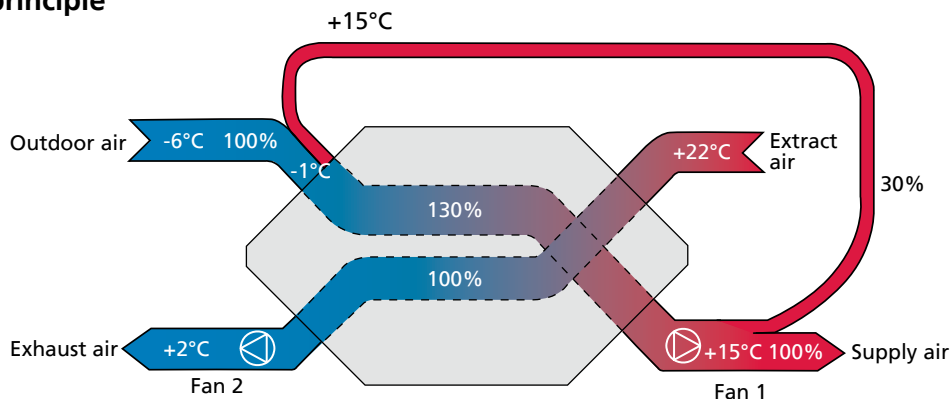
4. Constant pressureregulated supply air with fixed extract air setting
6. Constant pressure regulated supply air with slavecontrolled extract air

Constant pressure regulation of both extract air and supply air

7. Constant pressure regulation of both extract air and supply air



Return air principle



Energy calculations

Minimal heat loss with VEX340

Ventilation and airing out can be a major source of energy loss from a building.

To maintain good indoor air quality it is necessary to continually replace the air, so that moisture and odours can be removed from a room. Heat loss resulting from air replacement is significantly reduced when ventilation units with heat recovery are used.

Heat loss is practically zero when the VEX340 is installed.

The advantage of counter flow heat exchangers compared to cross-flow heat exchangers is illustrated in the example below, which shows the variable temperature curve for a whole year (24 x 365 = 8760 hours).

Conditions:

Extract air temperature: 22 °C

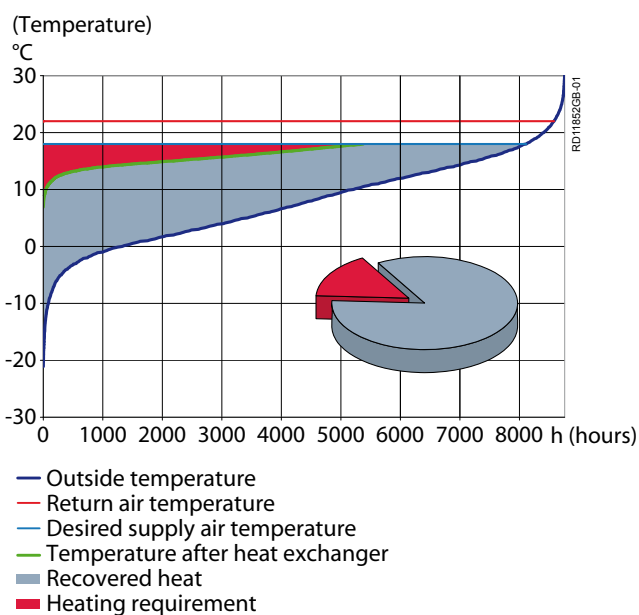
Supply air temperature: 18 °C

with equal airflows

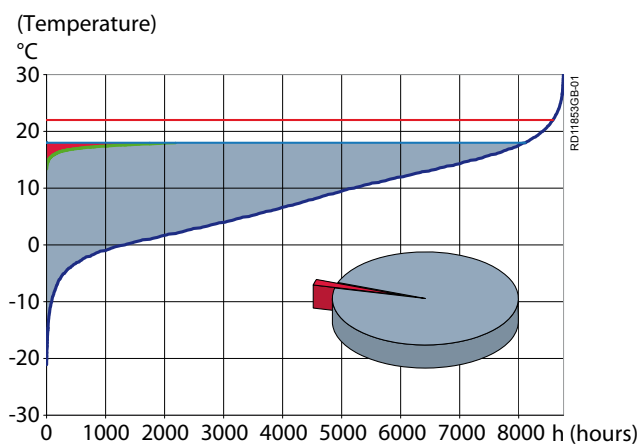
The blue area shows the given share of recovered heat in the heat exchanger, and the red area shows the need for supplemental heat up to 18 °C (desired supply air temperature), if a heating coil is fitted.

Corresponding energy calculations can be done using EXselect, our product selection tool, where conditions such as operating hours, supply/extract air temperatures can be selected. Icing of heat exchanger is not calculated.

Cross-flow heat exchanger



VEX340 counter flow heat exchanger



EXact control system - List of functions

The table below describes the control system functions. More detailed descriptions of selected functions are shown on the following pages.

Function / component	Description	● Standard ○ Accessory
Filter monitor	Pressure sensors for monitoring the pressure drop across the filters – alarm for a fall more than the value set and "Early Warnings"	●
Bypass	In the case of modulating bypass of extract air, the heat recovery is reduced to maintain the desired supply air temperature	●
Temperature sensors	1) In the extract air spigot to measure/control room temperature 2) In the exhaust air spigot to measure exhaust air temperature 3) In the outdoor air spigot for outdoor air temperature compensation and night-time cooling 4) In the supply air spigot to measure/control supply air temperature 5) Duct temperature sensor 6) Room temperature sensor	● ● ● ● ○ ○
Overheating protection	If there is a danger of the motors or frequency converters overheating the unit will shut off – manual reset.	●
Fire alarm	Fire thermostats (40/50/70°C), smoke detector and other fire detection switches can be connected. In the case of a tripped fire alarm, the unit's functions are adjustable.	○
Closing damper, outdoor air (requirement for water heating coil)	The damper is fitted in the outdoor air duct – it shuts when the unit stops – available with a spring-return motor	○ (●)
Closing damper, exhaust air	The damper is fitted in the exhaust air duct – it shuts when the unit stops – available with spring-return motor	○
Regulating temperature	Regulation of the supply air temperature Regulation of the room temperature	● ●
Compensation functions	Outdoor air temperature compensation Airflow reduction Outdoor airflow compensation Summertime compensation CO ₂ compensation Humidity compensation	● ● ● ● ● ●
Night-time cooling	The unit can be set to start at night to cool the building	●
Frost protection	Automatic energy-saving feature for preventing icing in the counter flow heat exchanger	●
Control panel	Panel for operation at user, technician and specialist level	●
Weekly clock	For setting the times required for changes between indoor air quality levels	●
Bus communication	Modbus RTU Modbus TCP/IP LONWORKS®	● ○ ○
Web server	Integrated web server allowing control and monitoring over the internet.	●
Cooling recovery	On-demand cold recovery	●
Constant pressure regulation	Possible for both extract and supply air	○
Motion sensor (PIR)	For automatic control of indoor air quality level	○
Airflow measurement	Airflow shown in control panel	●
Indoor air quality levels	Timer-controlled (comfort, standby, economy, off) Manual	● ●
Alarm log	Displays the last 100 alarms	●
Timers	Supply air motor, extract air motor motor	●
Alarm relay	Relay for external alarm	●

EXact control system - List of functions for accessories

HCW - External water heating coil

Function / component	Description
Temperature sensors	<ol style="list-style-type: none"> 1. In the supply air duct to measure/control supply air temperature 2. On the return pipe from the water heating coil to keep the heating coil warm and protect it from icing 3. To protect external piping linked to the heating coil from icing 4. Temperature sensor on water heating coil supply pipe
Modulating motor valve	Valve for variably regulating the flow of water to the cold water coil, depending of the cooling requirement
Circulation pump control	<ol style="list-style-type: none"> 1. Control of the water heating coil circulation pump 2. Heat requirement function (keeps heating coil frost-free) 3. Built-in control to run the circulation pump during periods when heating is not required

CCW - External cold water coil

Function / component	Description
Temperature sensors	<ol style="list-style-type: none"> 1. In the supply air duct to measure supply air temperature 2. In the cold water coil supply pipe
Modulating motor valve	Valve for variably regulating the flow of water to the cold water coil, depending of the cooling requirement
Circulation pump control	<ol style="list-style-type: none"> 1. Control of the cold water coil circulation pump 2. Built-in control to run the circulation pump during periods when cooling is not required

HCE - External electrical heating coil

Function / component	Description
Temperature sensors	In the supply air duct to measure/control supply air temperature
Overheating protection	<ol style="list-style-type: none"> 1. TSA60 is situated on the circuit board, trips at 60 °C and has manual reset on the HMI panel 2. TSA70 is situated in the air flow, trips at 70 °C and has automatic reset 3. TSA120 is situated in the air flow, trips at 120 °C and has manual reset i HCE and HMI

MXCU - External cooling control

Function / component	Description
Temperature sensors	In the supply air duct to measure supply air temperature
	Control of external cooling unit via start/stop signal and on-demand regulation 0–10 V

EXact control system - Advanced functions

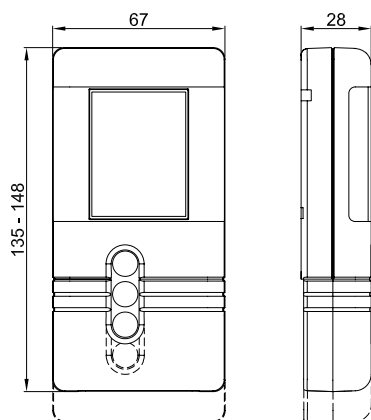
TEMPERATURE	Regulation principles	Room temperature or supply air temperature regulation can be selected. The control system regulates temperature using heat/cold recovery and controls external cooling/heating coils or cooling unit if the cooling/heating demand is greater.
	Regulating room temperature	The room temperature is regulated using the unit's built-in temperature sensor in the extract air spigot or an external room/duct sensor. Room temperature summertime compensation is also available.
	Supply air temperature regulation	Supply air temperature is regulated using the unit's built-in temperature sensor in the supply air spigot. Regulating supply air temperature allows for outdoor air compensation.
	Night-time cooling	Comfort can be improved in large-mass buildings (weight) in the summer, by cooling the buildings at night using outdoor air. Night-time cooling is particularly suitable for offices, institutions, etc. where people do not work at night. Extra optimised function. Substantial energy savings in regards to cooling unit.
	Cooling recovery	If there is a need to cool the room or supply air temperature, and the extract air temperature is colder than the outdoor air, cold is recovered from the extract air and used to cool the supply air. Combined with the night-cooling function, this means practically no energy is needed to cool the supply air – as long as the extract air is colder than the supply air.
	Regulating room temperature – summertime compensation	When summertime compensation is selected, the set point for the desired room temperature will increase in line with the outdoor temperature. This avoids an unpleasant cold shock when there is a large difference between indoor and outdoor temperatures, and also saves energy.
	Outdoor air temperature compensation with supply air temperature regulation	Outdoor air compensation is achieved using the unit's built-in temperature sensor in the outdoor air spigot. When compensating for outdoor air temperature, the supply air temperature set point is lowered in summer and raised in winter. This compensates the supply air temperature in relation to the outdoor air temperature.
AIRFLOW CONTROL	Outdoor airflow compensation	The control system has a built-in function that reduces the airflow when outdoor air temperature falls. The temperature is measured in the outdoor air spigot.
	Airflow reduction	The airflow reduction function can be used when a heating coil is not fitted, or where the heating effect is not sufficient. The supply air is reduced relative to supply air temperature, to maintain the supply air temperature.
	Airflow control	The unit maintains the set airflow.
	Airflow compensation	The airflow is regulated, based on CO ₂ , humidity or temperature measurement.
SAFETY	Frost protection when using external water heating coil	Frost protection of the water heating coil is achieved using a temperature sensor on the return pipe. If the temperature falls under the set temperature during operation, the unit stops.
	Heat retention function when using external water heating coils	If the unit stops, a heat retention function is activated, which keeps the water in the return pipe at the set temperature. This minimises the risk of frost in the heating coil and the unit is ready to start immediately, even when the outdoor temperature is low.
	Starting the unit	On every start-up and before supply air begins, the system warms the heat exchanger with extract air for 30 seconds.
	Run on with external electric heating coil	Electrical heating coils have built-in run on, so that the fans run on at low speed for three minutes after the unit has been stopped. The heating coil is disconnected in that time.
	Filter monitoring	The unit has built-in filter monitoring. Limits are set via the control panel. The control panel will indicate if a filter needs changing and this is registered in the alarm list.
	Counter flow heat exchanger frost protection	Full description available on page 12

Technical specifications, modules

CONNECTION BOARD	
2 x LS (Closing damper, exhaust air/outdoor air)	Power supply 24 V DC ON/OFF 24 V DC Max. power consumption 0.3 A
BT (fire thermostat/smoke detector)	Max. 4 A breaking current
START/STOP	Digital input
ALARM	Change-over relay. Max 8 A @ 30 V DC or 250 V AC Load Resistance
Communication	Modbus RTU RS-485 TCP/IP (Ethernet/webserver)
MHCW (Control for water heating coil) MCCW (Control for cold water coil) MXCU (Control for external cooling unit)	
Communication	Modbus RTU RS-485
MVM power supply	24 V AC
MVM control signal	0-10 V DC
Relay contact for circulation pump	250 V, max. 5 A cos ϕ 0,97
MHCE (Control for electrical heating coil)	
Communication	Modbus RTU RS-485
Number power step	Up til 4
Modulating power step	Single-step
Mains voltage	3 x 400 V + N + PE

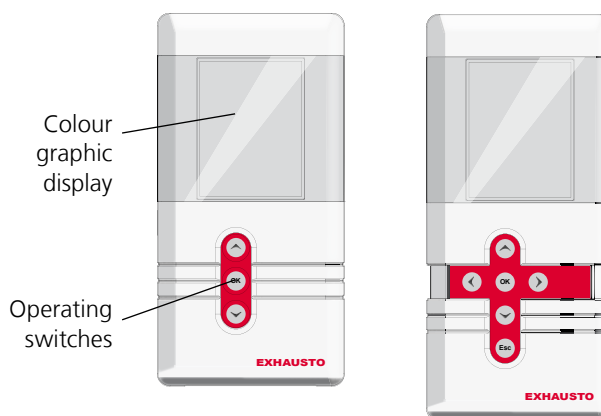
MIO (Modbus Input Output)	
Analogue input	0-10 V DC
Analogue output	0-10 V DC
Digital input	24 V DC
Digital output	open collector 1 A
Relay output	250 V max. 8 A, AC1
Temperature in	NTC 10 k Ω @ 25 °C
CO2 sensor	
Control signal, Analogue Output	0-10 V DC
Measurement range	0-2,000 ppm
Accuracy	+/- 20 ppm @ 25 °C
Humidity sensor	
Control signal, Analogue Output	0-10 V DC
Measurement range	5-95 % RH
Accuracy	+/- 3 % RH (30-70 % RH)
PIR sensor	
Perspective, horizontal	90 °
Range	6 m
Cut-out delay	10 min.
TS ROOM E / TS DUCT E	
Sensor	NTC 10 k Ω @ 25 °C

Dimensional sketch - HMI (control panel)



Control panel
locked mode

Control panel
open mode



Overview of simplified diagram abbreviations.

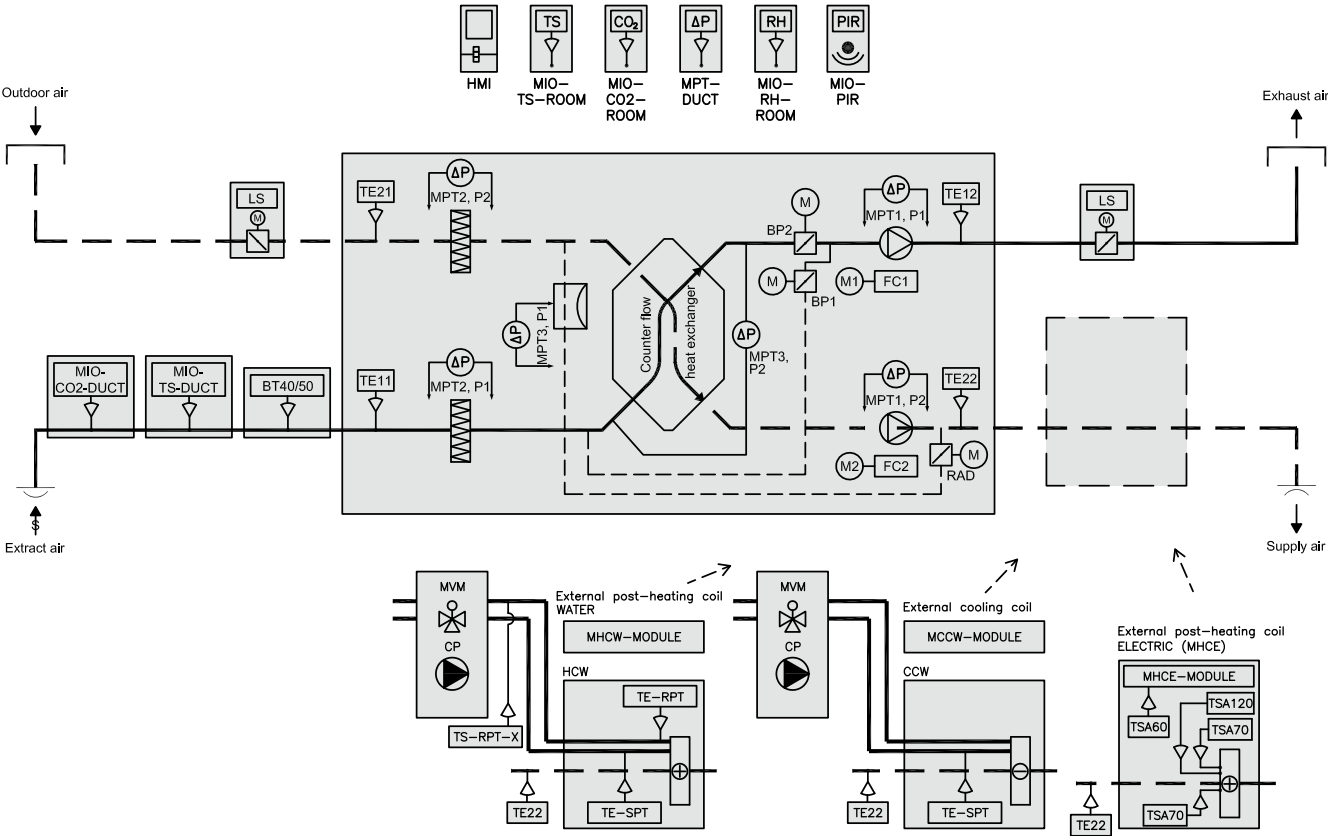
The VEX340 is supplied with components fitted in the unit or for fitting in the duct system and room.

The simplified drawing on the next page show components that can be included in a VEX340 air handling unit.

The table lists the components for the VEX340. Accessories must be ordered separately.

Abbreviation	Term	● = Standard ○ = Accessory
BP1	Damper motor, Bypass	●
BP2	Damper motor, Bypass	●
BT40/50/70	Fire thermostat, 40°C or 50°C and 70°C	●
FC1	Frequency converter 1	●
FC2	Frequency converter 2	●
HMI	Control panel	●
LS	Closing damper, exhaust air	○
LS	Closing damper, outdoor air (required and supplied with water heating coil)	○ (●)
LSR	Closing damper (spring return)	○
MVM	Motor valve, water heating coil (HCW)	●
M1	Fan motor, 1	●
M2	Fan motor, 2	●
MCCW	Cold water coil, control system	○
MHCE	Electrical heating coil , control system	○
MHCW	Water heating coil, control system	○
MIO-CO2-DUCT	CO ₂ sensor, duct	○
MIO-CO2-ROOM	CO ₂ sensor, room	○
MIO-PIR	PIR sensor	○
MIO-RH-ROOM	Humidity sensor (RH)	○
MIO-TS-DUCT	Temperature sensor, extract air duct (external)	○
MIO-TS-ROOM	Temperature sensor, room	○
MPT-DUCT	Pressure sensor for constant pressure regulation	○
MPT1, P1	Airflow control, extract air	●
MPT1, P2	Filter monitor, extract air	●
MPT2, P1	Airflow control, supply air	●
MPT2, P2	Filter monitor, outdoor air	●
MPT3, P1	Extract airflow control	●
MPT3, P2	Ice detector	●
RAD	Motor, extract air damper	●
SUM ALARM	Alarm relay	●
TE1,1	Temperature sensor, extract air – spigot 1.1	●
TE1,2	Temperature sensor, exhaust air– spigot 1.2	●
TE2,1	Temperature sensor, outdoor air – spigot 2.1	●
TE2,2	Temperature sensor, supply air – spigot 2.2	●
TE-RPT	Temperature sensor, return pipe from water heating coil (HCW)	●
TE-SPT	Temperature sensor, supply	●
TS-RPT-X	Temperature sensor, return, external piping (HCW)	●
TSA 60/70/120	Overheating thermostat, 60°C, 70°C and 120°C	●

Simplified diagram



Cable plans

Dimensioning of cable and fuses

The electrician installing the unit is responsible for ensuring that all sizes used are compatible with current legislation and regulations.

The VEX340 heat recovery unit has a built-in isolation switch and automatic fuses for overload and short-circuit protection. The HCE electric heating coil has a built-in isolation switch and the control system has short-circuit protection. HCE internal cables and heating element have short-circuit protection, via a fuse in the distribution board (not supplied by EXHAUSTO).

Maximum short circuit current (I_{cu}), in accordance with EN60947.2 is 10 kA.
Maximum fuse rating is 63 A gG/gL.

Accessory types HCW, CCW and XCU do not require separate supply cables and can be directly connected to the VEX340 control system box. Terminals (U1, N) may only be used with the above mentioned accessories, and can have a maximum load of 1.8 A.

A maximum of one HCW (heating coil) and one CCW/XCU (cooling) can be connected. The EXact control prevents both operating at the same time.

HCE-type accessories must have a separate power supply.

Maximum phase current is the dimensioned current for choice of cable.

Equalising connections

Equalising connections must be established between the VEX and HCE-type accessories.

Fitting of earth leak circuit breakers

If earth leak circuit breakers are fitted, they must meet the following standards:

- a) PFI breaker **type A**, as per EN61008, which breaks the circuit when leakage-current is registered with DC content (pulsating DC).
- b) Cutout time must be max. 0.3 s.

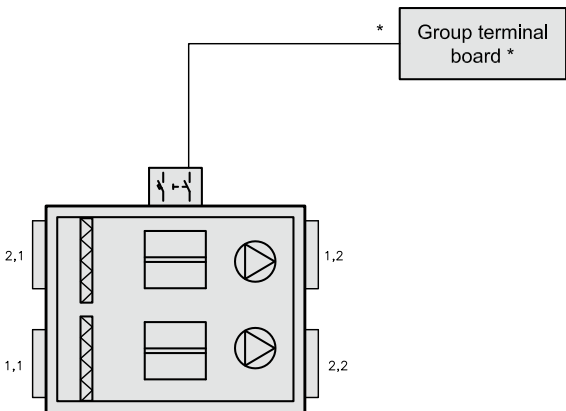
The current leakage can be up to 300 mA.

Automatic built in fuses VEX340

Size	Current (V)	Fuse for control system (1 x 230 V) 2 pole	General fuse for FC1 and FC2 (1 x 230 V) 2 pole	Total number of fuses
VEX340	1 x 230 V + N + PE	10 A	13 A	2

FC1 = Frequency converter 1 FC2 = Frequency converter 2

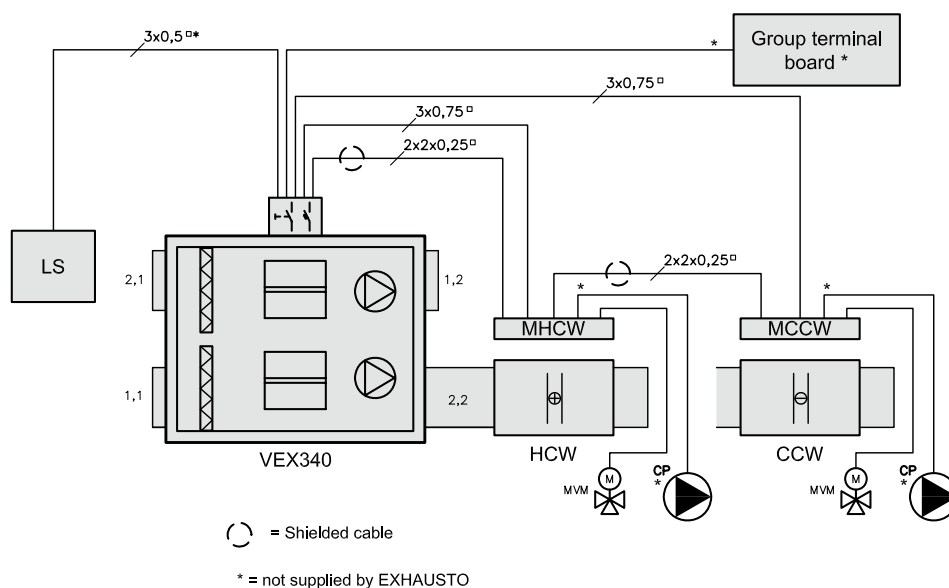
VEX340 without external heating coil



VEX340: General

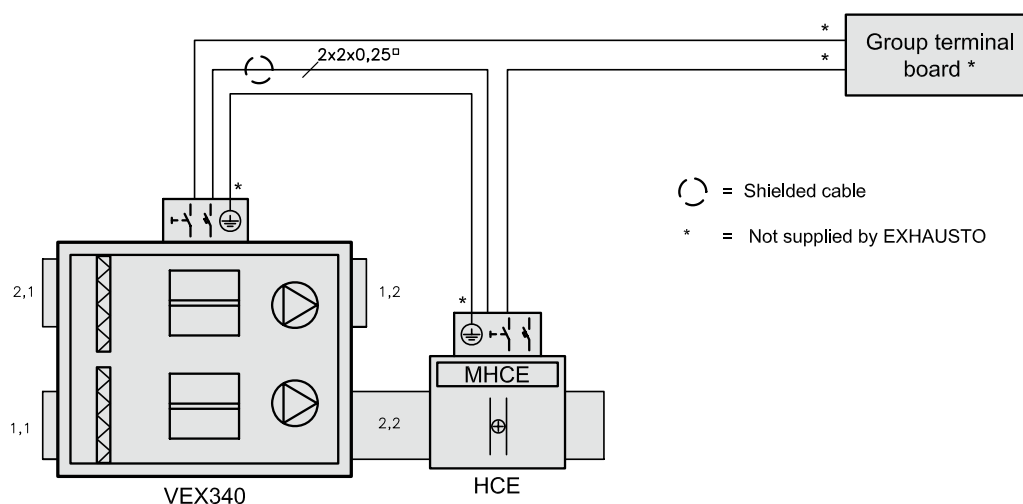
Cable plans

VEX340 with external heating coil - Water heating coil (HCW) / cold water coil (CCW)



Size	Current (V)	Dimensioned power consumption (A) (max. phase current)
VEX340	1 x 230 V + N + PE	13

VEX340 with external heating coil – Electrical (HCE)

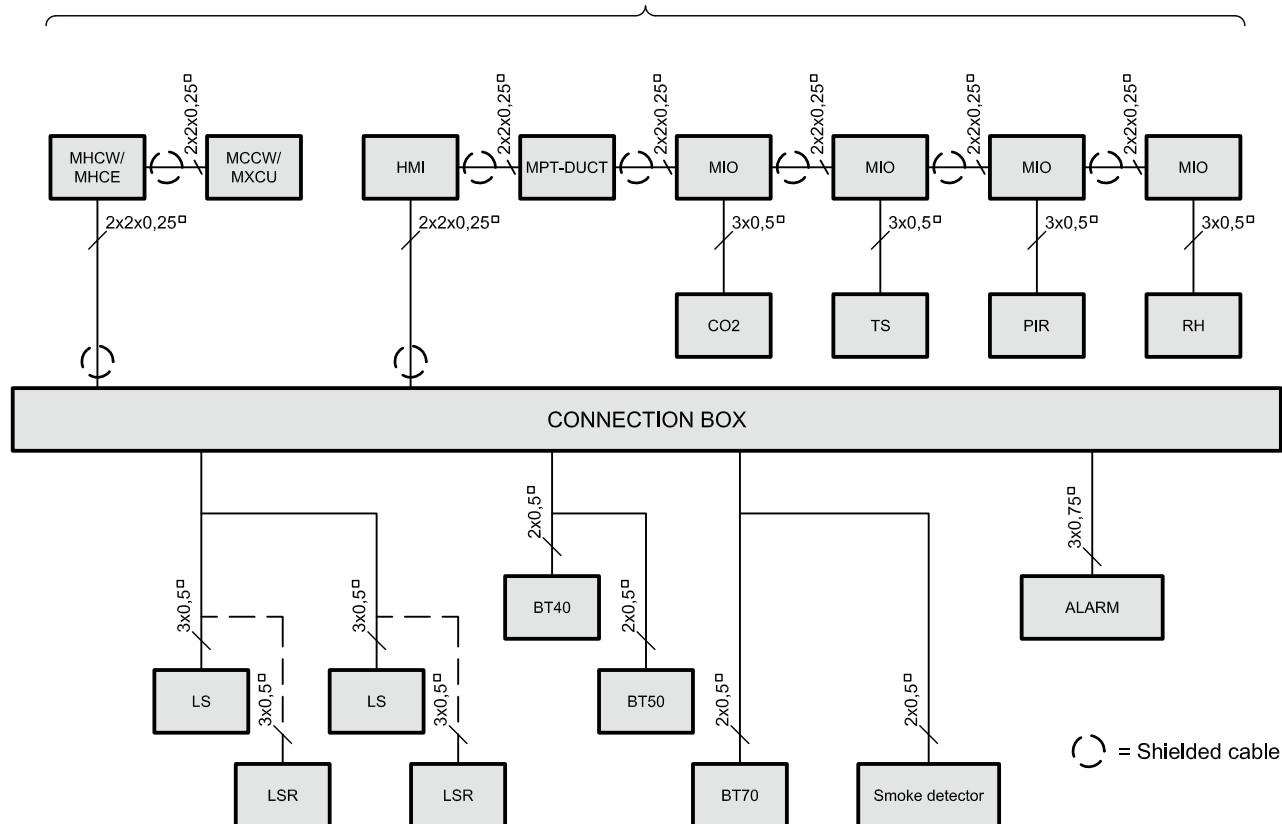


VEX340 / HCE340

Size	Current (V)	Dimensioned power consumption (A) (max. phase current)
VEX340	1 x 230 V + N + PE	13
HCE340	3 x 400 V + N + PE	8.7

Cable plan - Accessories

Max. 200 m cable connection in total
The sequence of the modules is unimportant



Abbreviation	Term
ALARM	Alarm relay
BT40	Overheating thermostat 40 °C
BT50	Overheating thermostat 50 °C
BT70	Overheating thermostat 70 °C
HMI	Control panel
LS	Closing damper, exhaust air
LS	Closing damper, outdoor air (a requirement of a water heating coil installation)
LSR	Closing damper, exhaust air/outdoor air (spring return)
MCCW	Cold water coil, automatic
MHCE	Electrical heating coil, automatic
MHCW	Water heating coil, automatic
MIO-CO2	CO ₂ sensor
MIO-PIR	PIR sensor
MIO-RH	Humidity sensor (RH)
MIO-TS	Temperature sensor
MPT-DUCT	Pressure sensor for constant pressure control
MXCU	Cooling automatic for control of external cooling system
Smoke detector	Smoke detector

VEX340 - outdoor installation

The cabinet is insulated with 50 mm mineral wool and therefore well-suited to outdoor installation.

A unit that is installed outdoors is supplied with a fitted cover. The cover is designed so that cables can be led under the cover on both sides, and at the back of the unit. The motor valve, damper and fire thermostats will also be supplied as suitable for outdoor installation.

Cold water coil can also be used for outdoor fitting. Must be stated on order.

We recommend the outdoor unit is fitted with additional support to prevent storm winds from causing imbalance.

Separate cover for outdoor installation

Cover's middle section can open, giving access to the control system.

NB:

The condenser pipe to the VEX must be frost protected and insulated during installation.



EXHAUSTO - indoor air quality makes a difference



Technologies

EXHAUSTO provides three technologies within heat recovery, cross-flow heat exchangers, rotary heat exchangers and counter flow heat exchangers. The three technology platforms have their own unique advantages and applications.

Our innovation is aimed at energy optimisation in all regards - we develop products that set the standard for future energy requirements.

System solutions

EXHAUSTO consistently develops system solutions that support professional project planning of ventilation for residences, offices and schools. Every single system meets both regulatory requirements and building owners' needs and requirements.

The individual systems are naturally supported by the EXHAUSTO products best suited to each and every installation.

Indoor air quality competences

EXHAUSTO is part of VKR Holding A/S, incorporated in the company's ventilation and indoor climate business area. VKR Holding A/S aims to provide customers with innovative and energy-efficient solutions to ensure an excellent indoor climate in new and existing buildings. To read more visit www.vkr-holding.com. At EXHAUSTO, we consistently strive to improve the performance of our products, to enhance not only indoor air quality but also the global climate – benefiting everyone. It's about finding the balance between comfort, energy-efficient solutions and economically-viable operating solutions.